

## Consumer Perceptions of the Doneness of Cooked Steak

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### INTRODUCTION

The aim of this study was to compare what New Zealand consumers say they like in terms of meat doneness with what they choose when steaks at various degrees of doneness are physically presented. Knowing what consumers say they prefer and what it means in terms of endpoint internal temperatures is important information for food service industries.

### METHODOLOGY

With a conventional sensory ballot form, 76 staff members (38 male, 38 female) at MIRINZ asked for their preference of doneness in a cooked steak: very rare, rare, medium rare, medium, medium well done, well done and very well done (Savell *et al.*, 1995). No steaks were shown.

Panellists were also asked why they preferred their steaks done that way, whether they were the main steak cook in their household, their frequency of eating steak, their sex and age, and their origins, rural or urban.

A week later a visual preference panel was performed. No mention was made of the earlier unprompted questionnaire. Steaks, which had a trace of marbling and a pH around 5.7, were cooked on a hot plate to 55, 60, 65, 70, 75, 80 or 85°C, ranging from very rare to very well done. The cooked steaks were sliced and pieces arranged on a polystyrene tray in order (left to right) of increasing doneness. The internal condition of the steaks was clearly visible. The endpoint temperatures of the seven slices were not shown, rather three digit random numbers. Most of the 76 original panellists were available to select the piece they most preferred from the selection of seven. The panellist preferences in the first questionnaire were compared with their preferences to the range of endpoint appearances.

### RESULTS AND DISCUSSION

Because the questionnaire gave no prompting, no guidelines, no pictures, nor previous anchor points for each level of doneness, the principal question might reasonably represent a consumer choice in a restaurant situation. The most common preference was medium rare, 44% of the panellists. None of the panellists' characteristics (age, sex, rural or urban origins, frequency of consumption, and others) was significantly related to the degree of doneness the panellists said they preferred.

The main reasons for wanting steaks cooked to medium or a lesser degree of doneness were flavour, juiciness and tenderness. The preference of people for a well done steak were most often for visual reasons which were typically related to blood, e.g. "I don't like seeing blood". Health/safety reasons were also advanced, particularly by microbiologists in the panel.

The range of endpoint cooking temperatures produced a clear doneness continuum from 3 mm of surface browning to browning throughout the entire steak with no trace of redness. Of the 76 who answered the first questionnaire, 62 completed the visual preference test with the steak pieces. The histogram in Figure compares the results of the questionnaire and the visual test by the 62 panellists. The distributions are strikingly different, being much more evenly spread in the visual test. The data in Figure 1 suggest that the panellists who defected from the dominant category in the unprompted questionnaire - medium rare - chose better done steaks in the visual test. This was confirmed by an analysis summarized in Table which shows the direction in which the panellists 'moved' from their original preference.

**Table 1.**  
An analysis of preference changes after the visual preference test.

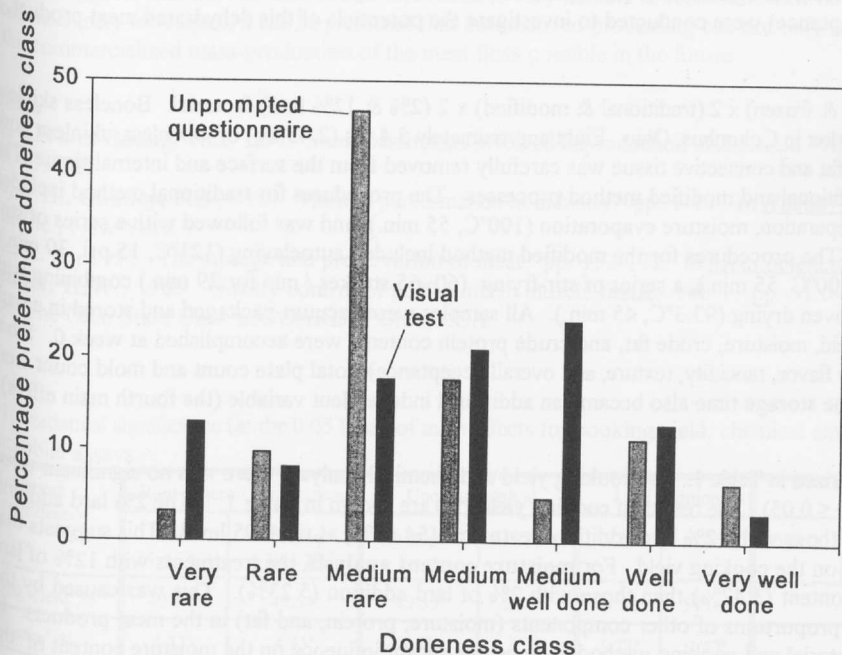
Degree of doneness in the visual panel	Fraction of panellists changing their preference at the visual panel (%)	The average preference change value <sup>†</sup>	
		Was	in the direction of
Very rare	0	0.00	No net change
Rare	100	-0.33	Rarer
Medium rare	76	0.66	Better done
Medium	64	-0.09	Rarer
Medium well done	67	0.00	No net change
Well done	72	-0.43	Rarer
Very well done	75	-0.75	Rarer

<sup>†</sup> The doneness classes were ascribed a value, (very rare) to 7 (very well done). The difference values between the two preferences were averaged on the basis of the preference stated in the unprompted questionnaire.

The data show a clear mismatch between perceived and actual preference, and begs the question as to how restaurant chefs can make valid judgements when, for example, an order for a medium rare steak is placed. However, it is clear from the data presented that steak cooked to medium or medium well done will satisfy most diners. However, in a study of consumer assessments of steak, Cox *et al.* (1997) found that 30% of the consumers did not receive their steaks cooked to their ordered degree of doneness, with a corresponding decline in consumer satisfaction. There was a greater dissatisfaction penalty from over-cooking than under-cooking steaks. The problems associated with degree of doneness are exacerbated by the effects of a raised ultimate pH that in turn raises the cooking temperature required to get a given degree of doneness (Cox *et al.*, 1994). If consumer issues are to be addressed it is important that more information be available to consumers and that a more consistent product be produced because complications arising from factors such as meat ultimate pH will only create confusion.

## REFERENCES

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**Figure 1.**  
 Preferences for steak doneness in an unprompted questionnaire and a visual test. There were 62 panellists.